

# BULLETIN

## OF THE INSTITUTE OF METALS

VOLUME 3

APRIL 1956

PART 8

### INSTITUTE NEWS

#### Membership Subscription Rates

The Council has had in mind for some time past that an increase in membership subscriptions would be inevitable, but has delayed a decision on this matter as long as possible.

It has now concluded that, in view of the continual rise in costs of printing and binding, of postal and packing charges, and of various services connected with the efficient administration of the Institute's work that have taken place since the present membership subscription rates were fixed in 1947, and also of the increase in the volume of the Institute's publications, a change in the membership subscription can no longer be delayed. In consequence, with effect from 1 July 1956, the rates of membership subscriptions will be as follows:

Ordinary Members . . . .	£5 5s. (\$15.15)
Junior Members . . . .	£3 3s. (\$9.25)
Student Members ( <i>no change</i> ) . . . .	£1 15s. (\$5.35)

Those who are joint members with the Iron and Steel Institute or the Institution of Metallurgists will still be entitled to claim the present rates of reduction of subscription to the Institute. The Council is glad to be able to maintain the rate of annual subscription of Student Members unaltered, owing to the financial support given by industry.

Members will have realized, from their experience in other fields, that costs of materials and services have increased continuously during the past 10 years, and it is hoped that they will appreciate that, in all the circumstances, the increases in membership subscription rates now decided upon are very reasonable.

#### Election of Members

The following 7 Overseas Sustaining Members, 10 Ordinary Members, 1 Junior Member, and 17 Student Members were elected on 2 March 1956:

##### *As Overseas Sustaining Members*

Aktieselskabet Nordiske Kabel- og Traadfabriker, La Coursvej 7, Copenhagen F, Denmark.  
Paul Bergøe & Søn, Glostrup, Copenhagen, Denmark.  
Bristol Brass Corporation, 580 Broad Street, Bristol, Conn., U.S.A.  
Lewin-Mathes Company, 1111 Chouteau Avenue, St. Louis 2, Mo., U.S.A.

Mueller Brass Company, 1925 Lapeer Avenue, Port Huron, Mich., U.S.A.

Triangle Conduit and Cable Co., Inc., P.O. Box 711, New Brunswick, N.J., U.S.A.

Wolverine Tube Division of Calumet and Hecla, Inc., 1411 Central Avenue, Detroit 9, Mich., U.S.A.

##### *As Ordinary Members*

FRANKLIN, Robert Dumont, B.A., B.S., Director, Toledo Public Library, 325 Michigan Street, Toledo 2, Ohio, U.S.A.

HÄKKÄ, Lennart Rafael, Dipl. Eng., Technical Director, Oy Kovametalli Ab., Helsinki, Finland.

KESSLER, Hermann Georg, Dr.rer.nat., Head of Laboratories, Aluminiumwerke Nürnberg, G.m.b.H., Nürnberg, Nopitschstrasse 67, Germany.

LÄHTEENKORVA, Ernesti Eliel, M.S., Ph.D., Research Metallurgist, Oy Vuoksenniska Ab., Imatra Iron Works, Imatrankoski, Finland.

MAJEWSKI, Henryk Andrzej, B.Sc., A.M.C.T., A.I.M., Chemist and Metallurgist, W. T. Glover and Co., Ltd., Trafford Park, Manchester 17.

DE MORTON, Maurice Edwin, A.M.(elb.)T.C., A.I.M., Research Officer, British Welding Research Association, 29 Park Crescent, London, W.1.

REIMS, Maurice, Elect. Eng., Superintendent of Laboratory and Development Department, Finska Kabelfabriken Ab., Båtsmansgatan 29-31, Helsingfors, Finland.

SCHETKY, Laurence McDonald, B.Ch.E., M.Met.E., Ph.D., Metallurgist, Instrumentation Laboratory, W3-106, Massachusetts Institute of Technology, Cambridge 39, Mass., U.S.A.

SENZ, Richard R., B.S., Chief Metallurgist, Buffalo Works, Aluminum Company of America, 1880 Elmwood Avenue, Buffalo 7, N.Y., U.S.A.

SHARP, Victor Albert, A.S.T.C., A.I.M., A.A.C.I., Metallurgist, National Forge Pty., Ltd., Somerville Rd., Brooklea, Footscray, Vic., Australia.

##### *As Junior Member*

RIGBY, Anthony Frederick, B.Eng., Metallurgist, Thomas Bolton and Sons, Ltd., Mersey Copper Works, Widnes, Lancs.



## INSTITUTE NEWS

### *As Student Members*

- BRAMHILL, Peter John, B.Sc., A.M.C.T., Technician-under-Training, A. V. Roe and Co., Ltd., Greengate, Middleton, Manchester.
- COLLINS, Derek Tyrrell, Undergraduate, Royal School of Mines, London, S.W.7.
- DERRICK JONES, William Joseph, Undergraduate, Royal School of Mines, London, S.W.7.
- KJOLLES DAL, Hallstein, Cand.jur., Student, Metallurgy Department, The Royal Technical College, George Street, Glasgow, C.I.
- LING, Peter John, Undergraduate, Royal School of Mines, London, S.W.7.
- MILLER, David Colin, Undergraduate, Department of Metallurgy, University of Liverpool.
- NICHOLLS, Garth Farnol, Assistant Chief Metallurgist, Henry Meadows, Ltd., Fallings Park, Wolverhampton.
- NICHOLLS, John Robert, Undergraduate, Royal School of Mines, London, S.W.7.
- NOTMAN, George Kenneth, Undergraduate, Royal School of Mines, London, S.W.7.
- PEACOCK, David Emms, Undergraduate, Royal School of Mines, London, S.W.7.
- PICK, Richard Earle, Undergraduate, Royal School of Mines, London, S.W.7.
- RILEY, Colin Charles, Assistant Metallurgist, Nelson Research Laboratories, English Electric Co., Ltd., Stafford.
- ROGERS, Thomas Raymond, High Duty Alloys, Ltd., Winclescales, Workington, Cumberland.
- RUTTER, Michael Trenery, Undergraduate, Royal School of Mines, London, S.W.7.
- TONGE, John Richard Thornhill, Undergraduate, Royal School of Mines, London, S.W.7.
- WELLS, Martin Godfrey Headlam, Undergraduate, Royal School of Mines, London, S.W.7.
- YOUNG, David Ronald, Undergraduate, Royal School of Mines, London, S.W.7.

The following 3 Overseas Sustaining Members, 11 Ordinary Members, 3 Junior Members, and 16 Student Members were elected on 21 March 1956:

### *As Overseas Sustaining Members*

- Chicago Extruded Metals Company, 1602-42 South 54th Avenue, Chicago 50, Ill., U.S.A.
- Nederlandse Koperenbuizenfabriek N.V., Zijldijk 19, Leiderdorp, Netherlands.
- Scovill Manufacturing Company, Waterbury 20, Conn., U.S.A.

### *As Ordinary Members*

- ABE, Hideo, B.A.Eng., Assistant Professor, Department of Metallurgy, Faculty of Engineering, University of Tokyo, Bunkyo-Ku, Tokyo, Japan.
- BROWN, Catherine Margaret, B.Sc., Head Chemist, N.Z. Metal Smelters, Ltd., 98 Neilson Street, Onehunga, Auckland, S.E.5, New Zealand.
- COOPER, Professor Keith Leo, M.A., B.Sc., A.M.I.C.E., A.M.I.E.A., Professor of Civil Engineering, University of Western Australia, Nedlands, Western Australia.
- DONAHOE, Francis J., B.A., Ph.D., Research Investigator, The Franklin Institute, 20th and Parkway, Philadelphia 3, Pa., U.S.A.

- FRANCE, Walter D., B.Eng., Assistant Director, Metals Research Department, Scovill Manufacturing Company, 99 Mill Street, Waterbury, Conn., U.S.A.
- IWAMURA, Professor Harero, D.Eng., Professor of Metallurgy, Ibaraki University, Narusawa Town, Hitachi City, Ibaraki Prefecture, Japan.
- MORINAGA, Professor Takuichi, D.Eng., Tokyo Institute of Technology, 1 Ookayama Meguroku, Tokyo, Japan.
- MUTHER, Herbert, Engineering Superintendent, Guillermo Decker S.A., Belgrano 836, Buenos Aires, Argentina.
- SCHUIL, Bob, Director, Nederlandse Koperenbuizenfabriek N.V., Zijldijk 19, Leiderdorp, Netherlands.
- SMITH, Raymond Lloyd, M.S., Ph.D., Section Chief, Metallurgy, The Franklin Institute, 221 North 21st Street, Philadelphia, Pa., U.S.A.
- WATANABE, Ryoji, B.Tech., Assistant Professor, Hokkaido Gakugei University, Hakodate Branch, 153 Hachimancho, Hakodate, Hokkaido, Japan.

### *As Junior Members*

- NEWELL, Frederic William, B.Sc., Research Physicist, Metallurgy Research, Birmingham Small Arms Co., Ltd., Armoury Road, Small Heath, Birmingham 11.
- SHAW, Ronald Peter, Assistant Metallurgist, J. Blakeborough and Sons, Ltd., Brighouse, Yorkshire.
- WATKINSON, John Francis, B.Met., Ph.D., A.I.M., Principal Research Metallurgist, Metallurgy Research, Birmingham Small Arms Co., Ltd., Armoury Road, Small Heath, Birmingham 11.

### *As Student Members*

- AKBAR, Khakid, Student Trainee, Ransome, Sims and Jefferies, Ltd., Ipswich, Suffolk.
- ARCHER, Anthony John, Undergraduate, Department of Metallurgy, University of Nottingham.
- BATEMAN, Charles William, Metallurgical Chemist, Garringtons, Ltd., Bromsgrove, Worcestershire.
- BEASLEY, David, Undergraduate, Department of Metallurgy, University of Nottingham.
- CHATHAM, Peter Gordon, Undergraduate, Department of Metallurgy, University of Cambridge.
- DENNIS, John Keith, Undergraduate, Department of Metallurgy, University of Nottingham.
- FEARNEHOUGH, Geoffrey David, Undergraduate, Department of Metallurgy, University of Manchester.
- FOOKES, Barry Gordon, Undergraduate, Department of Metallurgy, University of Nottingham.
- HAYNES, John, Undergraduate, Department of Metallurgy, University of Nottingham.
- HENSTOCK, Michael Edward, Undergraduate, Department of Metallurgy, University of Nottingham.
- MARSHALL, Brian Edward, Undergraduate, Department of Metallurgy, University of Nottingham.
- MORGAN, John, Undergraduate, Department of Metallurgy, University of Nottingham.
- MURPHY, John Brian, Metallurgist, Aluminium Laboratories, Ltd., Banbury, Oxon.
- RIMMER, Peter Felix, Student Metallurgist, Manganese Bronze and Brass Co., Ltd., Birkenhead, Cheshire.
- VEEVERS, Kenneth, Undergraduate, Department of Metallurgy, University of Nottingham.
- WYNBLATT, Paul, Undergraduate, Faculty of Technology, University of Manchester.



## NEW OFFICERS

The following 3 Overseas Sustaining Members, 8 Ordinary Members, 2 Junior Members, and 15 Student Members were elected on 2 April 1956:

### *As Overseas Sustaining Members*

Aluminium-Industrie, A.G. Neuhausen-am-Rheinfall, Switzerland.

Aluminum Company of America, Aluminum Research Laboratories, P.O. Box 772, New Kensington, Pa., U.S.A.  
Metallwerke, A.G., Dornach, Switzerland.

### *As Ordinary Members*

BESSANT, William Edward, B.A.Sc., Assistant Technical Superintendent, Northern Aluminium Co., Ltd., Banbury.  
COLLOC'H, Pierre, Ing.A.et.M., Directeur de l'Usine de Bornel, Etablissements E. Louyot, Bornel (Oise), France.

ENGLANDER, Marcel, Chef de Groupe, Service de Technologie, Centre d'Etudes Nucleaires de Saclay, Commissariat à l'Energie Atomique, Gif-sur-Yvette (S. et O.), France.

FELL, Ernest Allen, Assoc.Met., B.Met., Research Metallurgist, Development and Research Department Laboratory, The Mond Nickel Co., Ltd., Wiggin Street, Birmingham.

LEU, Kurt Werner, Dr.-Phil., Ph.D., D.I.C., Research Chemist, Koninklijke/Shell-Laboratorium, Badhuisweg 3, Amsterdam-N., Netherlands.

LUDDEN, Frederick C., B.A., M.Chem., Supervisor of Methods, Revere Copper and Brass, Inc., Rome, N.Y., U.S.A.

MOSS, John Barry, A.Met., A.I.M., Assistant Lecturer in Metallurgy and Chemistry, Wandsworth Technical College, London, S.W.18.

POWELL, Benjamin E., A.B., B.S., Ph.D., Librarian, Duke University, Durham, N.C., U.S.A.

### *As Junior Members*

ELSE, John William, B.Sc., Pilot Officer, Royal Air Force, No. 2 Officers' Mess, R.A.F., Oakington, Cambridge.

SCOTT, Geoffrey Crichton, Laboratory Technician, A. C. Scott and Co., Ltd., City Road, Manchester 15.

### *As Student Members*

BILLINGHAM, Ronald, Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham 16.

BROPHY, Jere Hall, B.S.E. (Ch.E.), B.S.E. (Met.E.), Graduate Student, Metallurgical Engineering, University of Michigan, Ann Arbor, Mich., U.S.A.

BROWN, Clive, Undergraduate, Department of Metallurgy, University of Durham.

CLARKSON, Harold Richard, Student Metallurgist, 23 Westland Drive, Hayes, Kent.

FONTAINE, Paul Isadore, Student of Metallurgy, Handsworth Technical College; Laboratory Assistant, The Mond Nickel Co., Ltd., Wiggin Street, Birmingham 16.

HEWSTON, Rodney James, Student of Metallurgy, Handsworth Technical College; Apprentice Metallurgist, Development Department, Birmingham Small Arms Co., Ltd., Redditch, Worcs.

LEE, Peter James, Student of Metallurgy, Handsworth Technical College; Laboratory Assistant, Hardy Spicer, Ltd., Birch Road, Witton, Birmingham 6.

ORFORD, Raymond Leslie, Student of Metallurgy, Handsworth Technical College; Apprentice Metallurgist, L. H. Newton and Co., Thimble Mill Lane, Birmingham 7.

PARKER, Robert Geoffrey, Student of Metallurgy, Handsworth Technical College; Metallurgist, Tube Products, Ltd., Popes Lane, Oldbury, Birmingham.

PEARCE, William Sames, Chemist, De Havilland Engine Co., Ltd., Stag Lane, Edgware, Middx.

STANLEY, Robert Edward, Student of Metallurgy, Handsworth Technical College; Trainee Metallurgist, Brooke Tool Co., Ltd., Warwick Road, Greet, Birmingham 11.

TURNER, Donald Alan, Metallurgist, The Mint (Birmingham), Ltd., Icknield Street, Birmingham 18.

WALL, Philip Martin, B.Sc., A.M.C.T., Technician-under-Training, A. V. Roe and Co., Ltd., Greengate, Middleton, Manchester.

WEIR, Robert Riddell, Student of Metallurgy, Coatbridge Technical College; Colvilles, Ltd., Clydebridge Steel Works, Cambuslang, Lanarkshire.

WILLIAMS, Peter John, Student of Metallurgy, Handsworth Technical College; Metallurgical Chemist, Minworth Metals, Ltd., Forge Lane, Kingsbury Road, Minworth, near Birmingham.

## NEW OFFICERS

Below are given some biographical details of members who take office as President, Vice-Presidents, and Ordinary Members of Council at the Annual General Meeting on 11 April.

### **Major C. J. P. Ball**

#### **(President)**

Charles James Prior Ball was born in 1893 at Cowes, Isle of Wight, and was educated at Charterhouse and University College, London.

During the 1914-18 War he was commissioned into the Royal Artillery, and took part in the landing at Cape Helles, Gallipoli, on 25 April 1915, with the 15th Brigade, R.H.A. Commanding first "B" Battery, R.H.A., and later the 460th Howitzer Battery, he served with this Brigade in all its operations in Gallipoli, Sinai, France, Belgium, and the march into Germany. He was mentioned in Dispatches three times, and awarded the D.S.O. and M.C.

After serving in Germany with the British Army of Occupation and the Military Inter-Allied Commission of Control, he retired from the Army in June 1923 to join F. A. Hughes and Co., Ltd., as Managing Director, where he became closely identified with the development of the use of magnesium metal, both at home and abroad. He joined the Board of Sterling Metals, Ltd., Coventry, in 1927.

When F. A. Hughes became a fully-owned subsidiary of The Distillers Co., Ltd., in 1946, Major Ball was invited to join the Board of that Company, being appointed to the Management Committee in 1948. He is also Chairman of Magnesium Elektron, Ltd., and of the following Companies, either controlled by or associated with the D.C.L. Group: British Resin Products, Ltd., British Geon, Ltd., Distrene, Ltd., Murgatroyds Salt and Chemical Co., Ltd., and Grange Chemicals, Ltd., as well as being a director of several other companies.

Major Ball's main interest in metals is with magnesium, and for the last thirty years he has been working to create wider usage of this indigenous material. He is the author of a number of publications on magnesium and its alloys.



## NEW OFFICERS

Major Ball was elected a Member of the Institute of Metals in 1937, and served as a Member of Council from 1945 to

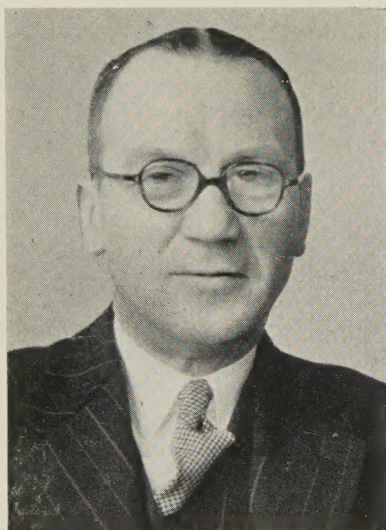


1949, and as a Vice-President from 1949 to 1952, and again since 1953. He was Chairman of the Finance and General Purposes Committee from 1948 to 1952. He is a Fellow of the Royal Aeronautical Society.

### Dr. N. P. Inglis

(Vice-President)

Norman Peter Inglis was born in 1902. After graduating with First Class Honours from the University of Liverpool, he carried out research there on the fatigue of metals and later continued this work at the University of Illinois, Urbana, U.S.A., under Professor H. F. Moore.



On returning to England in 1927, he was appointed to Synthetic Ammonia and Nitrates, Ltd. (now the Billingham Division of Imperial Chemical Industries, Ltd.) and was in charge of the metallurgical section at Billingham from 1928 to 1938. In 1938 he was appointed Engineering Research

Manager of the Billingham Division of I.C.I., and continued in that post until December 1950. He was appointed a Director of the Metals Division of Imperial Chemical Industries, Ltd., in 1947 and became Research Director of that Division in January 1951.

Dr. Inglis is a member of the Institution of Mechanical Engineers and a former Vice-President of the Institution of Metallurgists, on whose Council he served for several years. He has been a member of the Institute of Metals since 1928 and a Member of Council since 1952.

### Dr. Ivor Jenkins

(Vice-President)

Ivor Jenkins was educated at the Secondary School, Gower-ton, and, as a Folland Scholar, studied metallurgy at the University College of Wales, Swansea, where he gained a B.Sc. degree with First Class Honours in Metallurgy in 1934, and subsequently received the M.Sc. (1938) and D.Sc. (1948) degrees of the University of Wales.



He joined the Scientific Staff of the Research Laboratories of The General Electric Co., Ltd., Wembley, in 1934 to work under Dr. C. J. Smithells. After leaving there for a time in 1944-45 to assist in the establishment of a new Research Laboratory for the Whitehead Iron and Steel Co., Ltd., Newport, Mon., Dr. Jenkins returned to the G.E.C., where he succeeded the late Mr. S. V. Williams as Head of the Metallurgy Department. He was appointed Chief Metallurgist in 1952.

Dr. Jenkins is a member of the Inter-Service Metallurgical Research Council and of various committees of the British Non-Ferrous Metals Research Association and the British Cast Iron Research Association. His publications include a book on "Controlled Atmospheres for the Heat-Treatment of Metals" (1946) and numerous papers on general metallurgical problems associated with the electrical engineering industry, which have appeared in the journals of several societies. In 1947 he was awarded (jointly with Dr. B. Jones) the Williams Prize of the Iron and Steel Institute.

Dr. Jenkins has been a member of the Institute of Metals since 1932 and a Member of Council since 1952. He has served on the Publication Committee for the past seven years, and he is also Chairman of the *Metallurgical Reviews* Executive Committee.



## NEW OFFICERS

### Mr. G. L. Bailey

(Member of Council)

George Leo Bailey was born in 1901 and educated at King Edward VI Grammar School, Five Ways, Birmingham, and at Birmingham University, where he graduated in metallurgy in 1921. He held a Bowen Research Scholarship in the Metallurgy Department at Birmingham in the year 1921-22 and was awarded the degree of M.Sc. in 1922 for his post-graduate research.

In 1922 he joined the staff of the Metallurgical Branch of the Research Department, Woolwich, where he remained until 1930, when he took up a post with the British Non-Ferrous Metals Research Association. He has served with the Association first as Chief Officer of the Development Department, later as Deputy Director, and since November 1944 as Director.

Mr. Bailey's main research work has been in the field of the casting of metals and alloys, particularly in the casting of brass ingots, and he was the joint author with Dr. R. Genders of a monograph on this subject. He has contributed a number of papers to the *Journal of the Institute of Metals*.

He has served on various metallurgical committees of the Minister of Supply and the Admiralty, and is a member of the Inter-Service Metallurgical Research Council and of the Non-Ferrous Metals Committee of that Council.

Mr. Bailey was elected a member of the Institute of Metals in 1921 and served as an Ordinary Member of Council from 1940 to 1944, as a Vice-President from 1944 to 1947, as representative of the Institution of Metallurgists at meetings of the Council from 1947 to 1949, and again served as an Ordinary Member of Council in 1950-52 and Vice-President 1952-55.

He was a Founder Member of the Institution of Metallurgists, a Vice-President from 1946 to 1949, Honorary Treasurer

was responsible for installing the first continuous bright-annealing furnace in Europe. He also investigated cold-rolling practice in Europe and the United States and studied the fundamentals of cold deformation. He was a founder member of a committee set up by the Motor Industry Research



Association to investigate the principles and problems of deep-drawing. This work was later taken over by the British Iron and Steel Research Association.

In 1939 Mr. Berry was appointed Assistant General Manager of Birmetals, Ltd., and subsequently, in 1942, was transferred to Birmingham Aluminium Casting (1903) Co., Ltd., as Works Director. Later he became Joint Managing Director and quite recently he was appointed a director of the parent company, Birmid Industries, Ltd. He is also a director of Cylinder Components, Ltd., and Birmid Auto Castings Pty., Ltd., of Australia.

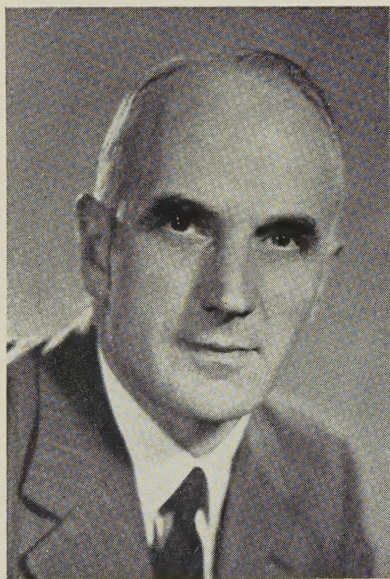
Mr. Berry has always taken a keen interest in technical education and was for many years Chairman of the Examinations Committee and of the Examination Board of the Institution of Production Engineers. He did much to promote the idea of a National Certificate in Production Engineering, and when this was eventually accepted by the Ministry of Education, together with a Joint Higher National Certificate with the Institution of Mechanical Engineers, he was, on its inauguration, alternate chairman of the controlling committee.

Mr. Berry was a Member of Council of the Institution of Production Engineers for some 20 years, and Section President of the Birmingham Branch for two years. He joined the Institute of Metals in 1949.

### Mr. G. E. Dono

(Member of Council)

George Edward Dono was born in 1903 at Hanley, Stoke-on-Trent, and trained as a locomotive engineer under Mr. H. G. Ivatt in the workshops of the North Staffordshire Railway Co., Ltd. In 1928 he joined Morris Motors, Ltd., Radiators Branch, subsequently becoming Works Manager (1933) and General Manager (1938). He was appointed a Director of Morris Motors, Ltd., in 1947 and is now responsible



from 1951 to 1955, and is President-Elect for the year 1956-57. Mr. Bailey was awarded the C.B.E. in the New Years Honours of 1952.

### Mr. J. W. Berry

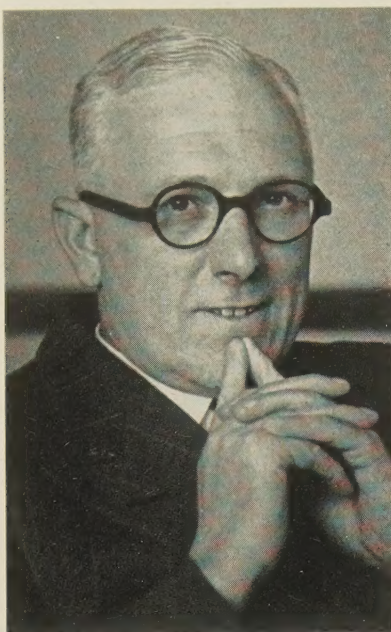
(Member of Council)

Joseph Wallace Berry held executive positions in the engineering field before entering metallurgical industry as Technical Adviser to Stourbridge Rolling Mills. Here he



## NEW OFFICERS

for radiator factories at Oxford and Llanelly and for The S.U. Carburetter Co., Ltd., Birmingham.



Mr. Dono is a Member of Council of the British Non-Ferrous Metals Research Association and a Governor of the Oxford College of Technology, Art, and Commerce. He is also a Justice of the Peace.

### Dr. H. M. Finniston

(Member of Council)

Harold Montague Finniston was born in 1912 and educated in Glasgow, where he attended the University and the Royal Technical College. He graduated with first-class honours in metallurgy in 1933. After a period in industry with Messrs.



Stewarts and Lloyds, Ltd., he returned to Glasgow in 1937 as Chief Research Officer of the Scottish Coke Research Committee. Having gained his Ph.D. degree in 1940, Dr.

Finniston joined the Bragg Laboratory of the Naval Ordnance Inspection Department, Sheffield, where he was in charge of the Metallurgy Section until 1946, when he was seconded by the Royal Naval Scientific Service to the Department of Atomic Energy. He went to Canada to organize the metallurgical side of the atomic-energy work there, and on his return in the following year became Deputy Head of the Metallurgy Division of the Atomic Energy Research Establishment at Harwell. In 1948 he was appointed to his present post of Head of the Metallurgy Division, and now holds the rank of Chief Research Scientist. From its inception in 1951, Dr. Finniston was for two years Chairman of the Oxford Local Section. He has served on the Publication, Metal Physics, and Nuclear Energy Committees of the Institute.

### Professor Hugh Ford

(Member of Council)

Hugh Ford was educated at Northampton School, and started his engineering career as a Premium Apprentice in the Great Western Locomotive Works, Swindon. In 1934 he gained a Whitworth Scholarship and entered the City and



Guilds College (Imperial College), London, where he obtained the B.Sc.(Eng.)(Lond.) degree with first-class honours, being also awarded the Unwin Scholarship (1936). He received his Ph.D. degree after three years' research on heat-transfer and fluid-flow problems.

From 1939 to 1942 he was a research engineer with Imperial Chemical Industries, Ltd., Alkali Division, Northwich, being mainly concerned with the development of high-pressure plant for polythene manufacture. He was then appointed Chief Engineering Officer in the Technical Department of the British Iron and Steel Federation. In 1945 he became Head of the Mechanical Working Division of the British Iron and Steel Research Association.

In 1948, he accepted the Readership in Applied Mechanics at Imperial College, University of London, and was awarded the D.Sc.(Eng.) degree of London. In 1951 he was appointed to his present post of Professor of Applied Mechanics, University of London.

Professor Ford has published over thirty papers in this country and abroad, principally in the field of metal working and mechanical properties of materials. He is Chairman of



## PERSONALITIES

the Applied Mechanics Group of the Institution of Mechanical Engineers and of the Research Panel of the Admiralty Advisory Committee on Structural Steel. In 1954, he was awarded the W. H. A. Robertson Medal and Premium of the Institute of Metals, jointly with J. G. Wistreich.

### Mr. C. H. M. Holden

(Member of Council)

Crosbie Hugh Messenger Holden was born at Birmingham in 1903 and educated at King Edward VI Grammar School, Camp Hill. In 1920 he joined the laboratory staff of Elliott's Metal Co., Ltd., Selly Oak, and then from 1925 to 1930 was metallurgist and fuel technologist to Cadbury Bros., Ltd. He was appointed Chief Chemist to Ratcliffs (Great Bridge), Ltd., in 1930 and remained there until, in 1941, he went to the Non-Ferrous Metals Control of the Ministry of Supply, Rugby.

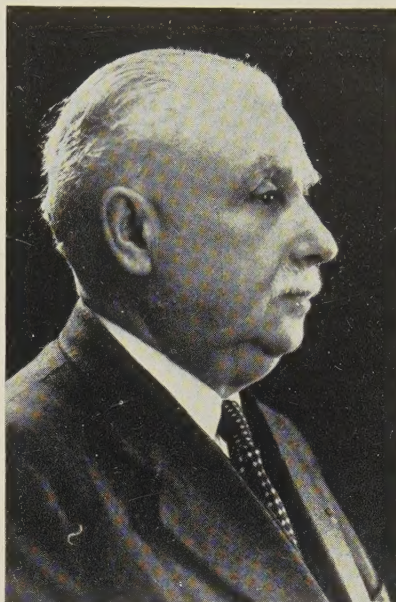
After the war, Mr. Holden joined the board of The Hall Street Metal Rolling Co., Ltd., Birmingham, and is now Managing Director of Charles Clifford, Ltd., Birmingham. He is a Past President of the Birmingham Metallurgical Society, a Fellow of the Institution of Metallurgists, and has been a member of the Institute of Metals since 1923.

He is a member of the Metallurgy Advisory Committee of the City of Birmingham Education Department, a member of the Advisory Committee of the City and Guilds of London Institute on Non-Ferrous Metals Operatives Course, and a member of the Non-Ferrous Metals Industry Standards



Committee of the British Standards Institution. He also serves on several committees of the British Non-Ferrous Metals Research Association.

artillery officer, he was appointed, in 1921, deputy director of the mineral chemistry laboratory at the Collège de France.



In 1928 he became Professor of Applied Chemistry and Director of the Institute of Applied Chemistry at the University of Lille.

In 1939 Professor Chaudron was appointed to his present posts of Professor of Applied Chemistry at the Sorbonne and Director of the laboratory which had just been built by the Centre National de la Recherche Scientifique at Vitry-sur-Seine.

Professor Chaudron's research work has been mainly in the fields of mineral chemistry and metallography. He has been responsible for establishing diagrams representing the equilibria between hydrogen, carbon monoxide, and the oxides of iron, which constitute the theoretical bases of numerous metallurgical processes, including that of the blast furnace. He will be best known to members of the Institute of Metals for his work on corrosion, surface states, new aluminium alloys, and metals of high purity. As a result of this last work, he has been appointed permanent consultant in metallurgy to the French Atomic Energy Commission. He was elected a member of the Académie des Sciences (Chemistry Section) in 1954.

At the meeting of the Institute of Metals held in Paris in September 1949, Professor Chaudron delivered the Autumn Lecture on "Recent French Investigations in the Field of Light Alloys", in which he dealt particularly with the metallographic studies carried out by himself and his colleagues (Lacombe, Beaujard, Hérenguel, and others) at the Vitry-sur-Seine Laboratory. He has been a member of the Institute of Metals since 1928, and is a Corresponding Member to the Council for France.

## PERSONALITIES

### Professor G. Chaudron

(Institute of Metals (Platinum) Medallist 1956)

Professor Georges Chaudron was born in 1891 and studied at the Sorbonne, carrying out the work for his doctor's thesis in the laboratory of the famous chemist and metallurgist, Henry Le Chatelier. After serving in the 1914-18 War as an

### Dr. D. McLean

(Rosenhain Medallist 1956)

Donald McLean was born in 1915 and educated at Manchester Grammar School and the University of Manchester, where he graduated with first-class honours in 1936. After spending two years with The Imperial Smelting Corporation, Ltd., he joined the Armaments Research Department (as it now is), where he was engaged chiefly on casting problems and in



## PERSONAL NOTES

investigating manifestations of brittleness that were troublesome in armament equipment.

In 1947, Dr. McLean moved to the National Physical Laboratory, Teddington, to work in the department of which Rosenhain was the first head. Here his researches have been



mainly concerned with micrographic studies of creep, and a number of papers on this subject have appeared in the Institute's *Journal* in recent years. For some time Dr. McLean has interested himself in grain boundaries, on which he has written a book, now in the press. He was awarded the D.Sc. degree of Manchester University in 1954.

### Mr. E. J. Thackwell

(W. H. A. Robertson Medallist 1955)

Edwin James Thackwell received his technical education at the Newton Heath Technical School, Manchester, the Manchester College of Technology, and the Oxford School



of Technology. He began his career in 1928 in the Engineering Research Department of Tootal Broadhurst Lee Co., Ltd., Manchester, assisting in development and construction work on process plant and test equipment.

After gaining experience for several years in various fields of mechanical and civil engineering, in 1936 Mr. Thackwell joined the Engineering Department of the Northern Aluminium Co., Ltd., at their Banbury Works, where he was engaged on general plant extension work. Subsequently he was transferred to Rogerstone, Mon., when the construction of the Company's plant there began. He was appointed Assistant Works Services Engineer in 1940 and later Production Engineer in the Heat-Treatment Department and also in the Remelting Department.

In 1946 Mr. Thackwell was transferred to the Company's General Engineering Department when this was formed at the beginning of the design and installation of the continuous strip mill at Rogerstone. At present he is engaged, as Engineer in the General Engineering Department, in the development and construction of melting and heat-treatment furnaces, casting machines, and ancillary equipment for the Company's works in Great Britain.

## PERSONAL NOTES

MR. D. C. BROWN has left Rotol, Ltd., to take up a post as metallurgist with C. A. Parsons and Co., Ltd., Newcastle-upon-Tyne.

DR. WEN-HSIANG CHANG has left the Rensselaer Polytechnic Institute and is now employed in the Large Turbine-Generator Section of the General Electric Company, Schenectady, N.Y.

MR. H. C. COE has been appointed Senior Research Officer in the Central Research Laboratories of the Broken Hill Pty. Co., Ltd., Shortland, N.S.W.

MR. R. J. P. CRIBB has left the London Transport Executive and taken a post with the U.K. Atomic Energy Authority, at Windscale Works, Cumberland.

DR. T. B. CROW, has left Foundry Services, Ltd., and has taken up an appointment with E. A. Lewis and Co., Ltd., Birmingham, metallurgical consultants and analysts.

MR. B. G. DAVIS has left the Royal Navy and taken up an appointment in the Research Laboratories of the General Electric Co., Ltd., Wembley.

DR. S. F. DOREY has been elected an Honorary Member of the Institution of Mechanical Engineers.

MR. I. FLINN has left the Research Laboratories of The British Aluminium Co., Ltd., and is now at the Mullard Research Laboratories, Salfords, near Redhill, Surrey.

DR. F. A. FOX has been appointed Chief Superintendent of the Defence Standards Laboratories, Department of Supply, Maribyrnong, Melbourne, Vic.

DR. H. H. HAUSNER, General Manager of the Nuclear Engineering Division of Penn-Texas Corp., has received the Powder Metallurgy Achievement Award of the Stevens Institute of Technology, Hoboken, N.J.

MR. V. L. JAMES has been appointed Lecturer in Metallurgy at Enfield Technical College.

MR. M. F. JORDAN has been awarded the degree of Ph.D. in Industrial Metallurgy at Birmingham University and is now an investigator on the staff of Aluminium Laboratories, Ltd., Banbury.



## LETTER TO THE EDITOR

MR. M. C. NICKSON has been awarded the Ph.D. degree of the University of London.

MR. K. C. RANDLE has left the Research Laboratories of the General Electric Co., Ltd., Wembley, and taken up an appointment with Rolls-Royce, Ltd., Derby.

MR. M. R. REEVE has left A/S Nordisk Aluminiumindustri and is now a Technical Officer in the Research Department of Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

DR. E. C. ROLLASON, who has been Professor of Metallurgy in the University of Liverpool since 1951, has been appointed Professor of Industrial Metallurgy in the University of Birmingham and will take up his duties on 1 September.

DR. A. R. E. SINGER has been appointed to the newly created Chair of Physical Metallurgy at University College, Swansea. The Chair has been provided by Richard Thomas and Baldwins, Ltd., and the Steel Company of Wales, Ltd., for the encouragement of research in fabrication metallurgy and metallurgical engineering.

DR. A. H. SULLY has been appointed Director of the British Steel Castings Research Association, Sheffield, in succession to Professor R. J. Sarjant. Dr. Sully had been Associate Director since March 1955.

MR. A. L. SUTTON has been awarded the D.Phil. degree of Oxford University. He is now at the laboratories of Richard Thomas and Baldwins, Ltd., Whitchurch, Aylesbury, Bucks.

MR. G. THOMAS has been awarded the Ph.D. degree of Cambridge University.

MR. A. H. WATERFIELD has left the Department of Scientific and Industrial Research to take up a post with Union Carbide Europa, S.A., Geneva.

MR. M. E. WILLIAMS has left Thomas Bolton and Sons, Ltd., and is now Technical Production Manager, James Bridge Copper Works, Ltd., Walsall.

### Deaths

The Editor regrets to record the deaths of:

MR. RICHARD ELSDON on 21 February 1956, at the age of 69. He was for many years Librarian of The Iron and Steel Institute and was in charge of the Joint Library of that Institute and the Institute of Metals from its formation in June 1938 until his retirement at the end of 1951.

MR. JOHN MCNEIL at Bombay on 21 February 1956. He had been with The Mond Nickel Co., Ltd., since 1927, and at the time of his death was Manager of the Company's Technical Office in Bombay.

## OBITUARY

### Mr. J. C. Jones

We regret to record the sudden death (on Christmas Day, 1955) of Mr. J. C. Jones, a member of the Institute since 1924.

John Clifford Jones was born on 22 February 1904, and was educated at Port Talbot County School and University College, Swansea. He obtained a First Class Honours B.Sc. degree in Metallurgy in 1925, followed by the M.Sc. degree in 1926 for a thesis on "The Influence of Annealing Temperatures on the Properties of Mild-Steel Sheets". In October 1926 he became Assistant Lecturer in the Department of Metallurgy

at University College, Swansea, and during the following four years published a number of papers on tinning operations. He joined the staff of the Research Laboratories of The British Aluminium Co., Ltd., at Warrington in 1930, as Assistant Metallurgist under Dr. A. G. C. Gwyer, serving especially as a liaison officer between the laboratories and the works. In November 1936 he was transferred to the office of the company's New York associates (Arthur Seligman and Co., Inc.) as a technical salesman and later served as a consulting metallurgist attached to the company's United States sales organization.

During the war, Jones was appointed to the United States War Production Board and occupied an important and influential position in regard to the war-time expansion of the American aluminium industry. In July 1955 he was made a Vice-President of Aluminum Transatlantic, Inc., which had succeeded Arthur Seligman as The British Aluminium Company's U.S. sales organization.

In the course of his residence in the United States, "J. C." accepted with enthusiasm and vigour the American way of life. He, in turn, was extremely popular with everyone he met, and his death at the early age of 51 is a heavy loss. We extend our sympathy to his widow, who survives him with a son.

C. J. SMITHELLS

### Dr. J. G. A. Skerl

Dr. John George Anthony Skerl, who died suddenly on 31 January 1956, had been in charge of Sternol, Ltd.'s activities in the foundry industry since 1936. In this capacity he was responsible for the development of a well-known range of core binders. Previously, from 1924 to 1935, he had been engaged in research on foundry sands and refractories at the British Cast Iron Research Association. For his work on British moulding sands he was made a Doctor of Science of London University in 1931.

Dr. Skerl will be well remembered by foundrymen for his work as a consultant. He was a fellow of the Institution of Metallurgists and a member of the Institute of Metals, the Iron and Steel Institute, and the Institute of British Foundrymen. He leaves a widow and two daughters.

## LETTER TO THE EDITOR

### An Analysis of the Miscibility Gap in the Chromium-Tungsten System

Binary alloy systems which have a miscibility gap in their equilibrium diagrams have proved of considerable thermodynamic interest. Hardy<sup>1</sup> has recently proposed a "sub-regular" solution model which he has applied to the immiscibility curves of the aluminium-zinc, gold-platinum, gold-nickel, and lead-zinc systems.<sup>1-3</sup> In this model the heat of solution of a regular solution<sup>4-6</sup> has been allowed to vary linearly with composition so that the excess free energy is given by:

$$\Delta F = A_1 x^2 y + A_2 x y^2 + RT(x \ln x + y \ln y) \quad (1)$$

where  $x$  and  $y$  are the atomic fractions of each component,  $T$  is the absolute temperature,  $R$  is the gas constant, and  $A_1$  and  $A_2$  are arbitrary constants which may be temperature-dependent.



It is a property of this expression that the solubility curve may be represented by the following expression:

$$\phi \equiv (x_1 + x_2) RT \ln \frac{x_1}{x_2} + (y_1 + y_2) RT \ln \frac{y_1}{y_2} \\ = - (A_1 - A_2) (x_1 - x_2)^3 \quad (2)$$

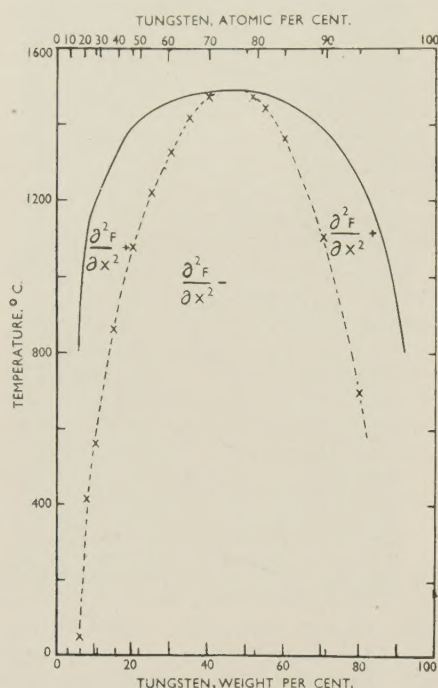


FIG. 1.—The Phase Diagram and the Calculated Spinodal Curve for the Chromium-Tungsten System.

— Phase boundary  $\alpha \rightarrow \alpha_1 + \alpha_2$   
 --- Spinodal curve  $\frac{\partial^2 F}{\partial x^2} = 0$ .

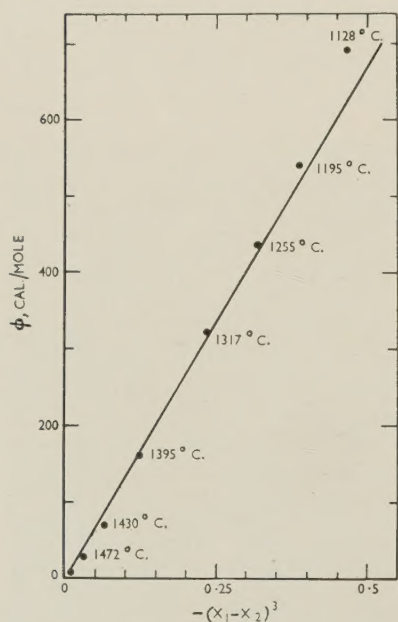


FIG. 2.—The Function  $\phi$  Plotted against the Function  $-(x_1 - x_2)^3$  for Chromium-Tungsten Alloys in the Temperature Range 1100°–1500° C.  $x_1$  and  $x_2$  are the atomic fractions of chromium.

where  $x_1 x_2$  and  $y_1 y_2$  are the equilibrium compositions along the solubility boundaries at temperature  $T$ .

To satisfy the sub-regular solution model,  $(A_1 - A_2)$  should be independent of temperature. If this is true, a straight line passing through the origin will be obtained when the left-hand side of equation (2), denoted by  $\phi$ , is plotted against the function  $-(x_1 - x_2)^3$ .

The phase diagram of the chromium-tungsten system has been determined by Greenaway.<sup>7</sup> The diagram shows that the alloys form a complete series of solid solutions at high temperatures, but that a miscibility gap occurs below 1500° C. (Fig. 1). The solubility data along this boundary have been plotted in the above manner in Fig. 2. In the temperature range 1200°–1500° C., the points lie approximately on a straight line passing through the origin. Below 1200° C., there is a gradual curvature which may be attributed to the asymmetry of the solubility curve. In general, agreement with the sub-regular solution model is perhaps better than might be expected from an alloy of two transition metals. Accordingly, the model has been used to determine the position of the spinodal curve ( $\frac{\partial^2 F}{\partial x^2} = 0$ ) in supersaturated solid solutions. This curve has been plotted in Fig. 1.

It is beyond the scope of this letter to discuss the relation between the precipitation process and the spinodal curve. However, the conditions under which pre-precipitation phenomena might be expected may be of interest in the development of heat-treatable chromium-tungsten alloys.

The author wishes to thank the Chief Scientist, Department of Supply, for permission to publish this letter.

I. J. POLMEAR

Aeronautical Research Laboratories,  
Melbourne, Australia.

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## NEWS OF LOCAL SECTIONS AND ASSOCIATED SOCIETIES

### London Local Section

At a meeting of the Section held on 1 March 1956 at 4 Grosvenor Gardens, London, S.W.1, Mr. F. H. KEATING (Chief Metallurgist, Imperial Chemical Industries, Ltd., Billingham Division) delivered a lecture on:

#### Metals for Chemical Engineering

The lecturer indicated at the outset that he would deal principally with the requirements of the heavy chemical industry and would devote attention to a few interesting problems rather than attempt to survey the whole field.

The applications of mild steel and cast iron were first considered, mention being made of surface protection methods; the possibilities were discussed of spheroidal graphite iron and of fully-killed grain-controlled steel in sub-zero temperature applications. The relatively small use of low-alloy steels in



## JOINT ACTIVITIES

corrosion duties was contrasted with their wide application in load carrying at elevated and sub-zero temperatures.

In considering the austenitic steels, attention was concentrated on their deficiencies and shortcomings, with special mention of stress-corrosion cracking. Considerable discussion was devoted to the problems of handling high-pressure carbon monoxide and hydrogen.

A brief survey of applications of the non-ferrous metals concluded the lecture.

### Scottish Local Section

#### Presentation to Mr. Matthew Hay

At a meeting held in Glasgow on 12 December 1955 a presentation was made on behalf of past and present members of the Local Section Committee to Mr. MATTHEW HAY, in recognition of his 10 years' service as Honorary Secretary of the Section.

Mr. Hay was born in 1904 and educated at Barrhead High School, the Glasgow High School, and the Royal Technical College, Glasgow. He served his apprenticeship with John Macdonald and Co., Ltd., hydraulic engineers, and afterwards held appointments in several firms engaged in the production of mechanical handling plant, &c. In 1941 he joined A. Cohen and Co., Ltd., and is now General Manager of the firm's Glasgow Works.

The success of the Institute's Autumn Meeting in Glasgow in 1947 was in large measure due to the excellent arrangements for which Mr. Hay was mainly responsible, and it is expected that arrangements will again be in his hands when the Institute visits Glasgow next year.

## JOINT ACTIVITIES

### Sir George Beilby Memorial Awards, 1955

The Administrators of the Sir George Beilby Memorial Fund, representing the Institute of Metals, the Royal Institute of Chemistry, and the Society of Chemical Industry, have made awards from the Fund for 1955, each of one hundred and fifty guineas, to:

F. D. RICHARDSON, B.Sc., Ph.D.(Lond.), in recognition of his work on the thermodynamic properties of high-temperature systems, with special reference to iron smelting and steelmaking.

F. WORMWELL, M.Sc.(Manc.), Ph.D., D.Sc.(Lond.), in recognition of his work on surface reactions, with special reference to the mechanism of metallic corrosion, oxidation, and passivation processes.

Awards from the Fund are made to British investigators in science as a mark of appreciation of distinguished work, particularly in such fields as fuel economy, chemical engineering, and metallurgy in which Sir George Beilby's special interests lay. In general, the awards are not applicable to more senior investigators, but are granted as an encouragement to relatively young men who have done independent work of exceptional merit over a period of years. The Administrators are free, however, to interpret this general provision very widely in specific instances, as they have done this year.

F. D. RICHARDSON graduated in Chemistry at University College, London, in 1933, where his research for the Ph.D. was also carried out. He then went to Princeton University

as the holder of a Commonwealth Fund Fellowship. Throughout the war he served in the R.N.V.R. (Sp. Br.), first in H.M.S. *Vernon*, where he was particularly concerned with the "wiping" method of degaussing ships, and then at the Admiralty. In 1941 he invented the two-pounder star-shell, a novel illuminant which was used extensively in night actions by Coastal Forces and was subsequently recognized by the Royal Commission on Awards to Inventors. He was later appointed Deputy Director of Miscellaneous Weapon Development with the rank of Commander, being especially concerned with the development of new weapons for amphibious assaults.

He turned to metallurgy in 1946 when he joined the British Iron and Steel Research Association; there he built up the Chemistry Department and was later appointed Superintending Chemist. During this period, he worked extensively on the thermodynamics of iron and steelmaking. He extended his interest to include the pyro-metallurgy of non-ferrous metals in 1950, when he joined the Imperial College as Nuffield Fellow to establish the Nuffield Research Group in Extraction Metallurgy, with funds granted by the Nuffield Foundation. This is now a centre of research for both chemists and metallurgists interested in high temperatures.

FRANK WORMWELL graduated in 1926 with First-Class Honours in Chemistry at the University of Manchester and was awarded a Graduate Scholarship and a Graduate Prize. With the aid of a research grant from the Department of Scientific and Industrial Research, he gained the M.Sc. degree in 1927 for electrokinetic studies at solid/liquid interfaces, and in 1928 he was appointed a Junior Assistant in the Corrosion of Metals Section of the Chemical Research Laboratory, Teddington, working on fundamental studies of the corrosion of immersed metals. He was promoted to Scientific Officer in 1933, Senior Scientific Officer in 1945, Principal Scientific Officer in 1946, and Senior Principal Scientific Officer in 1954, when he became Head of the Corrosion of Metals Group. The University of London conferred on him the degrees of Ph.D. in 1932 and D.Sc. in 1953.

## OTHER NEWS

### The Properties of Metals at High Temperatures

The Gordon Research Conferences of the American Association for the Advancement of Science will this year include a conference on "The Properties of Metals at High Temperatures." This will take place at the New Hampton School, New Hampton, N.H., from 18 to 22 June 1956.

The Conferences were established to stimulate research in universities, research foundations, and industrial laboratories, by an informal type of meeting consisting of scheduled lectures and discussion groups.

Additional information may be obtained from W. George Parks, Director, Department of Chemistry, University of Rhode Island, Kingston, R.I.

### Symposium on X-Ray Microscopy and Microradiography

A Symposium on X-Ray Microscopy and Microradiography is being held under the auspices of the International Union of Pure and Applied Physics at the Cavendish Laboratory, Cambridge, from 16 to 21 August 1956.

The Symposium will include all microscopic methods which employ X-rays. It is intended to be a gathering of



those with some direct experience or interest, rather than a large public conference. Primary emphasis will be placed on the physical methods, in theory and practice. Sessions are planned on the reflection method, the contact method, and the projection method, and the leading exponents will introduce each subject. Sessions will also be devoted to applications in biology, medicine, metallurgy, and other fields, including industrial applications. Planning of the programme will be greatly helped if those who intend offering a paper will give early notice.

Further details of the programme and the accommodation arrangements can be obtained from the organizer, Dr. W. C. Nixon, Cavendish Laboratory, Cambridge.

### Heat-Treatment Practice

The Metallurgy (General) Division of the British Iron and Steel Research Association is organizing a conference on heat-treatment practice, to be held at Ashorne Hill, Leamington Spa, on 5 and 6 June 1956. Emphasis will be given to the consideration of practical problems connected with the heat-treatment of steel products, from small engineering components to large forgings.

Details of the conference programme and a synopsis of the papers to be delivered are obtainable from B.I.S.R.A., 11 Park Lane, London, W.1.

### Summer School of Welding

The Sixth Summer School of Welding organized by the British Welding Research Association will be held at Ashorne Hill, Leamington Spa, from Monday, 18 June, to Saturday, 23 June 1956.

This year an attempt is being made to provide a course designed to meet the increasing interest in specialized subjects. The course will therefore appeal particularly to managerial staff, research workers, engineers, and all those who are in any way concerned with the selection of materials or processes for welding.

The course is divided into the four groups listed below, each student being allowed to register for one group only: (A) gas-shielded welding, (B) resistance welding, (C) metallurgy and physics of welding, and (D) inspection, testing, and quality control in welding processes. The scheme of lectures is planned to provide an intensive training course for each group. The initial lecture will cover general principles and will be followed by lectures dealing with particular aspects and practical applications.

In contrast to previous summer schools, demonstrations relevant to the particular courses will be arranged in collaboration with the electrode and welding-equipment manufacturers, and more time will be devoted to this part of the programme than was done in the past.

The school is open to all, and those persons wishing to attend the school, or send representatives from their organizations, should obtain application forms as soon as possible. Application forms and programmes of lectures are obtainable from The Organizing Secretary, 6th Summer School of Welding, B.W.R.A., 29 Park Crescent, London, W.1.

### British Commonwealth Welding Conference, 17-29 June 1957

The Institute of Welding invites all those in the British Commonwealth who are interested in the welding processes and their applications to attend The First British Commonwealth Welding Conference to be held in London and Saltburn-by-Sea, Yorkshire, from 17 to 29 June 1957.

The objects of the Conference are: (1) To exchange information on the present technical position of the welding processes and their main applications within the Commonwealth. (2) To consider means of improving the exchange of technical information about welding among the countries of the Commonwealth. (3) To emphasize the importance of the contribution which welding can increasingly make to the development of modern engineering production.

An outline programme and Enrolment Form will be distributed at the end of October 1956. Copies will be sent to those who apply for them. The Conference will open in London on Monday, 17 June 1957, and will remove to Saltburn-by-Sea, Yorkshire on Sunday, 23 June, returning on Thursday, 27 June, to London, where it will close on Saturday, 29 June.

From London and from Saltburn, which is within easy reach of the main centres of heavy industry of the North East, works visits will be organized, so as to alternate with meetings for the discussion of technical papers. The works to be visited are being chosen to enable members of the Conference to see the most advanced welding techniques employed in a representative selection of British factories, engaged in the main types of welded construction.

There will be a full social programme, including a Conference Banquet. A special programme of visits and excursions will be provided for ladies accompanying members.

Ten sessions of three hours each will be allotted to the discussion of papers, and the Organizing Committee invites offers of papers for presentation at the Conference. All papers will be preprinted, in full or in summary form, and will be distributed to members before the Conference. Offers to contribute papers should be made on a form obtainable from the Secretary and must be received at the Conference Office by 1 August 1956. A full record of the Proceedings of the Conference will be published in 1958 by the Institute of Welding.

Further information may be obtained from The Secretary, The Institute of Welding, 2 Buckingham Palace Gardens, London, S.W.1.

## APPOINTMENTS VACANT

**G.K.N. GROUP RESEARCH LABORATORY** require a METALLURGIST to carry out work in the field of Titanium and its alloys. Candidates must have 1st or 2nd class Honours Degree in Metallurgy and at least 2 years' postgraduate experience. Applications in writing, giving full details of qualifications and experience, should be addressed to: The Director of Research, G.K.N. Group Research Laboratory, Birmingham New Road, Lanesfield, Wolverhampton. All communications to carry reference No. MT.1.

**HIGH DUTY ALLOYS, LIMITED, RESEARCH DIVISION, SLOUGH, BUCKS**, require metallurgists for investigation into the properties, development, and fabrication of titanium-base alloys and also of aluminium-base sintered materials. Candidates should possess an Honours Degree, or its equivalent, and have some experience, preferably in titanium-alloy metallurgy. The post offers scope for initiative and enthusiasm in an important and progressive organization. The salary paid will be commensurate with qualifications and experience. Applications, giving full details, should be addressed to: Staff Manager, High Duty Alloys, Ltd., Slough, Bucks.

**METALLURGICAL CHEMIST** required for works laboratory in London. Must have practical experience in assaying non-ferrous metals and residues. Write, with full particulars of experience and salary required, to Box No. 406, Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.



## APPOINTMENTS VACANT

**METALLURGISTS.** Vacancies exist in Research Laboratories of Aircraft company for Metallurgists who are of degree standard and who have industrial experience in Foundry Technology, Heat-Treatment, Strength of Materials, Metallography, or Physical Testing. Prospects in these positions are good, and applicants should send particulars to Box MF 396, A.K. Advg., 212a, Shaftesbury Avenue, London, W.C.2.

**METALLURGISTS AND METALLURGICAL CHEMISTS,** B.Sc., or equivalent, required for Tin Smelting Works in Singapore and Malaya. Applicants should be not older than 30 years, and preference will be given to single men. First-class passage and free furnished quarters provided. Provident Fund. Salary according to qualifications and experience, but not less than £1200 p.a. Apply, giving full details of age, qualifications, and experience, &c., to Box No. 402, The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

**PHYSICAL METALLURGIST** with degree or equivalent qualification in Metallurgy and experience of the practical application of Physical Metallurgy work, preferably in a Research Department, required to carry out a programme of laboratory investigational work on alloys and some technical service work in the Research Laboratory. Applications to Personnel Manager, Imperial Smelting Corporation, Ltd., St. Andrew's Road, Avonmouth, quoting reference MET/IM.

**QUALIFIED METALLURGIST** with degree or equivalent qualifications is required by the Baker Platinum Division of Engelhard Industries, Ltd. Duties would involve assisting in the technical control of the melting, casting, and working of a wide range of non-ferrous materials, as well as other processes connected with the light engineering industry. The successful candidate would also be expected to assist in the development of new materials and processes. Apply: Personnel Officer, Baker Platinum Division, Engelhard Industries, Ltd., 154 Vauxhall St., S.E.11 (REliance 5451).

**SENIOR ANALYST,** required to take charge of the Analytical Section of the Central Metallurgical Laboratories of a large Engineering Works in the East Midlands. Applicants having completed National Service and with experience in the application of the latest techniques of analysis to the wide range of materials usually encountered in an Engineering Works, including ferrous and non-ferrous metals, solid, liquid, and gaseous fuels, ashes and deposits, &c. Post pensionable. 5-day week. Applications, stating age, qualifications, and experience, to Box No. 404, The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

**SENIOR METALLURGIST** is required for supervision and direction of Metallurgical development work on Rocket Motors. The successful applicant should be B.Sc., B.Met., or equivalent, and should have had experience of metallurgical problems in engineering industry.

Write, giving full particulars and quoting W/JIM.16, to the Personnel Manager, Bristol Aircraft, Ltd., Weston Works, Oldmixon, Weston-super-Mare.

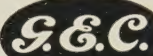
**SINTERED TUNGSTEN CARBIDE (HARD METAL).** Company manufacturing this material for specialized applications requires a first-class RESEARCH METALLURGIST. Successful candidate—who should have had previous research experience in this field—will be required to conduct on own initiative fundamental researches into chemical, physical, and metallurgical properties of sintered Hard

Metal with view to improving existing manufacturing methods and ultimate performance of Company's products. Candidates must have sound theoretical and practical knowledge of factors which contribute to improved performance of Hard Metal, including influence of grain-size, &c. Salary in accordance with qualifications and experience. Pension scheme. Please write in confidence, giving detailed information and salary required, to Box No. 405, Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

### UNIVERSITY OF NOTTINGHAM DEPARTMENT OF METALLURGY

Applications are invited for the appointment of a LECTURER or ASSISTANT LECTURER IN METALLURGY. Candidates should have a good Honours degree in Metallurgy, and preferably also works or research experience. Appointment to date from 1 October 1956. Salary scales: Lecturer—immediate appointment in the range of £650 to £1050, with possible advancement to £1350 per annum; Assistant Lecturer—£550 to £650 per annum. Superannuation and family allowance. Conditions of appointment and form of application from Mr. H. Pickbourne, Registrar.

**METALLURGICAL TRANSLATIONS** from French, German, and Italian undertaken by experienced translator. 35s. per 1000 words. References supplied. Mrs. L. F. Secretan, M.A., 8 Cambridge Road, Wimbledon, London, S.W.20.



### METALLURGICAL RESEARCH

The Research Laboratories of The General Electric Co. Ltd., East Lane, North Wembley, Middlesex, are seeking first class Physicists, Physical Chemists and Metallurgists, for an expanding programme of Metallurgical Research in many fields including Atomic Energy.

*One senior appointment might be made for which candidates should show evidence of considerable research ability and experience. They would be expected to show the scientific leadership necessary for a post of high responsibility.*

**Apply in writing to the Staff Manager (Ref. RLO/70), giving full particulars of experience, qualifications and age.**



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A BIBLIOGRAPHY

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*Second Edition compiled by* A. PRINCE, B.Met., A.I.M.

A great deal of work on the constitution of alloys has been carried out since the first edition of this *Bibliography* appeared in the autumn of 1942. As a result the new edition contains about twice as many references as the first.

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